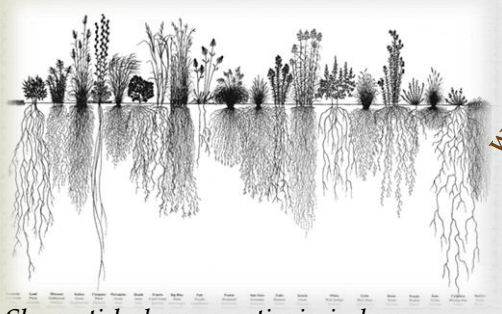
Soil Synergy

The biological component has the most influence on the chemical and physical components of soil synergy.

A diversity of living roots throughout the year provides habitat for soil biota and maintains the soil food web (SFW).



Clay particles have a negative ionic charge.

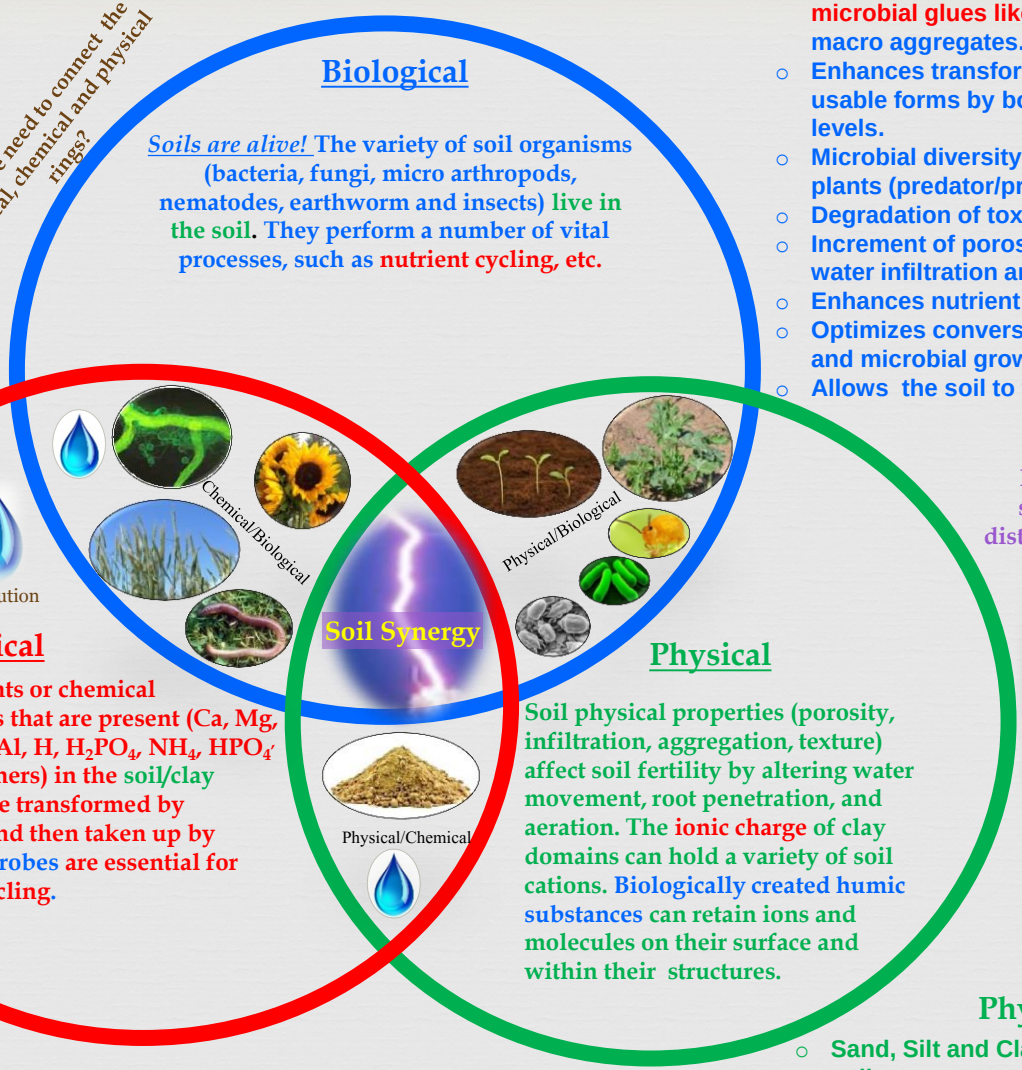
"Clay Domains" is a stack of parallel clay particles, held by ionic bonding & associated with humic substances.

"Humic Substances" are made by a process called humification (soil, water, biochemical and chemical reactions).

Chemical

- Photosynthesis relies on water and nutrient availability which are indirectly affected by soil microbial activities.
- Root exudates are the main source of food for soil organisms.
- Increased soil humus-clay complexes enhances:
  - Nutrient adsorption & retention.
  - The ability to hold more moisture in micro pores.
  - Cation Exchange Capacity (CEC).

Why do we need to connect the biological, chemical and physical rings?



Biological:

- Increases binding of soil particles (with microbial glues like Glomalin) to become macro aggregates.
- Enhances transformation of nutrients to other usable forms by both plant and other trophic levels.
- Microbial diversity minimizes disease in plants (predator/prey relationships).
- Degradation of toxic substances in soil.
- Increment of porosity in the soil improving water infiltration and aeration.
- Enhances nutrient cycling.
- Optimizes conversion of exudates to energy and microbial growth.
- Allows the soil to function at a higher level.

Keep a cover over the soil surface and minimize soil disturbance. Integrate grazing if possible.

All trophic levels must be working for the "Soil Food Web (SFW)" to function, including plant shoots and roots.

Physical

- Sand, Silt and Clay make up texture of the soil.
- Water stable aggregation influenced by a biological will enhance the ability to function at a higher level.
- Water infiltration and water holding capacity improve.
- Reduction of soil and water erosion.
- Enhanced water holding capacity
- Optimization of nutrient cycling.
- Improves CO_2 and O_2 exchange in the soil.

OBJECTIVE: A healthy soil is the result of a "*Soil Health Management System*" which promotes synergy among Biological, Chemical and Physical processes.

Ref: Cornell Soil Health Assessment Training Manual 2nd Edition (2009)

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http://www.nrcs.usda.gov/wps/portal/nrcs/detail/nm/technical/?cid=nrcs144p2_068965